

Thermal variability in the South China Sea and its relationship to the western Pacific warm pool

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We examine the temperature, heat content, and the size variability in the South China Sea (SCS) connected with the Western Pacific Warm Pool (WPWP), as well as upper-ocean thermal variability in the tropical oceans using satellite data and in situ measurements. Time–frequency–energy distributions, the periods of variability and its trend are extracted by the Empirical Mode Decomposition method and Hilbert–Huang transform method. The increasing rate of mean trend of Western Pacific Warm Pool area is $(2.0 \pm 0.2) \times 10^6 \text{ km}^2/\text{decade}$. Furthermore the warm pool area in the SCS has increased by $(0.2 \pm 0.03) \times 10^6 \text{ km}^2$ per decade. Observing from the energy of individual component, the semi-annual and annual components forcing from the East Asian monsoon play the main roles on SST variation. Using cross-lag correlation analysis, we demonstrated that the thermal variability in the SCS and WPWP are strongly correlated.

Keywords: South China Sea, Western Pacific warm pool, Thermal variability